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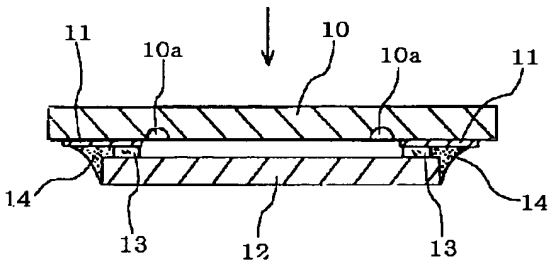
(54)【発明の名称】　固体撮像装置およびその製造方法

(57)【要約】
【課題】　安価で小型且つ薄型の固体撮像装置およびその製造方法を提供しようとするものである。
【解決手段】　外部に電気信号を出力する電極端子群と該電極端子群の周囲に溝枠を有するガラス基板と、前記ガラス基板上の電極端子群と前記溝枠の形成された面に対して接合された固体撮像素子と、前記固体撮像素子を封止するための封止樹脂とで構成した固体撮像装置とする。



【特許請求の範囲】
【請求項１】　外部に電気信号を出力する電極端子群と該電極端子群の周囲に溝枠を有するガラス基板と、前記ガラス基板上の電極端子群と前記溝枠の形成された面に対して接合された固体撮像素子と、前記固体撮像素子を封止するための封止樹脂とで構成したことを特徴とする固体撮像装置。
【請求項２】　ガラス基板上に溝枠を形成する工程と、前記溝枠の周囲に電極端子群を形成する工程と、前記ガラス基板上の電極端子群と固体撮像素子の突起電極とを接合する工程と、前記固体撮像素子を封止樹脂にて封止する工程とを有することを特徴とする固体撮像装置の製造方法。
【請求項３】　同一ガラス基板上に複数の溝枠を形成する工程と、前記溝枠の周囲に電極端子群を形成する工程と、前記ガラス基板上に形成した電極端子群と固体撮像素子の突起電極とを接合し、複数個の固体撮像素子をマトリクス状に実装する工程と、前記複数個の固体撮像素子を封止樹脂にて封止する工程と、前記複数個の固体撮像素子が実装されたガラス基板をダイシングにより切断し、個々の固体撮像装置に分離する工程とを有することを特徴とする固体撮像装置の製造方法。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は安価で小型且つ薄型の固体撮像装置およびその製造方法に関するものである。
【０００２】
【従来の技術】従来の固体撮像装置はＣＣＤを代表とする固体撮像素子をセラミックパッケージに搭載し、ガラスで封止した構造が一般的である。以下、従来の固体撮像装置について図面を参照しながら説明する。
【０００３】図１は従来の固体撮像装置の斜視図である。１はセラミックパッケージで、外部に電気信号を出力する端子群２を有している。セラミックパッケージ１の上面の凹部１ａには固体撮像素子３が受光部を上にした状態で搭載され、セラミックパッケージ１の上面の凹部１ａ内の電極４と固体撮像素子３表面の周辺に形成された電極（不図示）とが、ワイヤーボンディング法で金属細線５により電気的に接続されている。６はガラスで、固体撮像素子３の保護を目的としてセラミックパッケージ１の上部開口部分を蓋状に封止して固体撮像装置を構成している。
【０００４】図２は従来の固体撮像装置をレンズ体に組み込んだ状態を示す断面図である。セラミックパッケージ１は、電極端子群２を介して基板７に接続され、セラミックパッケージ１の上面にはレンズ８ａを備える筒状のレンズ体８が搭載されている。レンズ体に組み込まれた固体撮像装置はビデオカメラ等の撮像部として用いられている。
【０００５】被写体などを撮影した場合の入射光９はレンズ８ａを通り、セラミックパッケージ１の上面に設けられたガラス６を通過し、固体撮像素子３に入射する。入射した光は固体撮像素子３の受光部で電気信号に変換されて、画像データとして処理される。
【０００６】
【発明が解決しようとする課題】上述のような従来の固体撮像装置の構成では、固体撮像素子の電気的な接続方法として、セラミックパッケージの電極と固体撮像素子の電極とをワイヤーボンディングで接続しているが、固体撮像素子の周辺部に金属細線を配線するための電極を形成する領域が必要であり、固体撮像素子と封止用のガラスとの間に金属細線のループ形成に必要なスペースも確保する必要がある。このため、固体撮像装置が大きくなってしまい、小型、薄型化が困難であった。
【０００７】また、製造工程においても工数がかかり、ワイヤーボンディングを行うことにより固体撮像素子が大気に汚染される時間が長くなり固体撮像素子に悪影響を与えてしまう。さらに、セラミックパッケージを用いているので部材コストが高くなり、固体撮像装置が高価なものになっていた。
【０００８】本発明は安価で小型且つ薄型の固体撮像装置およびその製造方法を提供しようとするものである。
【課題を解決するための手段】
【０００９】外部に電気信号を出力する電極端子群と該電極端子群の周囲に溝枠を有するガラス基板と、前記ガラス基板上の電極端子群と前記溝枠の形成された面に対して接合された固体撮像素子と、前記固体撮像素子を封止するための封止樹脂とで構成した固体撮像装置とする。
【００１０】ガラス基板上に溝枠を形成する工程と、前記溝枠の周囲に電極端子群を形成する工程と、前記ガラス基板上の電極端子群と固体撮像素子の突起電極とを接合する工程と、前記固体撮像素子を封止樹脂にて封止する工程とを有する固体撮像装置の製造方法。
【００１１】同一ガラス基板上に複数の溝枠を形成する工程と、前記溝枠の周囲に電極端子群を形成する工程と、前記ガラス基板上に形成した電極端子群と固体撮像素子の突起電極とを接合し、複数個の固体撮像素子をマトリクス状に実装する工程と、前記複数個の固体撮像素子を封止樹脂にて封止する工程と、前記複数個の固体撮像素子が実装されたガラス基板をダイシングにより切断し、個々の固体撮像装置に分離する工程とを有する固体撮像装置の製造方法。
【００１２】
【発明の実施の形態】以下本発明の一実施形態を図に基づいて説明する。図３は本発明の一実施形態で固体撮像装置の断面図である。１０はガラス基板であり、該ガラス基板１０上には溝枠１０ａが形成されている。１１はガラス基板１０上に形成された外部に電気信号を出力す

る電極端子群で、溝枠１０ａの外周に形成されている。１２は固体撮像素子であり、固体撮像素子１２に設けられた突起電極１３と基板１０上の電極端子群１１が導電性接着剤等（不図示）により接続されている。１４は封止樹脂で、固体撮像素子１２とガラス基板１０の隙間を樹脂封止するものである。この場合、封止樹脂１４は固体撮像素子１２の外周に沿って塗布されている。前記封止樹脂１４を加熱硬化して固体撮像装置を構成している。

【００１３】図３の矢印は光の入射方向を示すもので、ガラス基板１０の溝枠１０ａの内側が受光エリアとなっている。溝枠１０ａは固体撮像素子１２を樹脂封止する際に、固体撮像素子１２とガラス基板１０の隙間から封止樹脂１４が受光エリア内に流れ込むのを防止するために設けられたものである。樹脂封止において封止樹脂１４が受光エリア側に流れ込んでも溝枠１０ａで吸収されることにより受光エリアへの侵入が防止できる。

【００１４】次に本発明の固体撮像装置の製造方法について図面を参照しながら説明する。図４から図６は各製造工程を示す図である。

【００１５】本発明の製造方法は、ガラス基板上に溝枠を形成する第１工程と、前記溝枠の周囲に電極端子群を形成する第２工程と、前記ガラス基板上の電極端子群と固体撮像素子の突起電極とを接合する第３工程と、前記固体撮像素子を封止樹脂にて封止する第４工程とを有する。

【００１６】図４はガラス基板の平面図で、ガラス基板上に溝枠を形成する第１工程と、前記溝枠の周囲に電極端子群を形成する第２工程を示す図である。まず、ガラス基板１０に溝枠１０ａを形成する。溝枠１０ａの形成は、エッチング法を用いることで容易にできる。溝枠１０ａを形成した後、溝枠１０ａの外側周辺に電極端子群１１を形成する。電極端子群１１は、ガラス基板１０の表面に蒸着法により銅、クロム、アルミニウム等の金属層を形成することで容易にできる。

【００１７】図５はガラス基板上の電極端子群と固体撮像素子の突起電極とを接合する第３工程を示す図である。固体撮像素子３の周辺部に形成された電極上には、Ａｕバンプ等により突起電極１３が形成されており、導電性接着剤等（不図示）を用いてガラス基板１０上の電極端子群１１と前記突起電極１３を接合する。突起電極１３の形成面は固体撮像素子１２の受光面と同一面にあり、ガラス基板１０の溝枠１０ａと電極端子群１１の形成された面に対して、フェースダウン実装する。ガラス基板１０の電極端子群１１と固体撮像素子１２の突起電極１３との接合は自動実装機により精度よく接合することが可能である。

【００１８】図６は本発明の固体撮像素子を封止樹脂にて封止する第４工程を示す平面図である。第３工程において、ガラス基板１０と固体撮像素子１２を接合した後、固体撮像素子１２の外周に封止樹脂１４を塗布し、加熱して硬化する。封止樹脂にはエポキシ系の樹脂を用いるが、封止樹脂が固体撮像素子１２とガラス基板１０の狭い隙間から受光エリア側に多少侵入しても溝枠１０ａに流れ込むことによって、受光エリア内までは侵入することが無い。上記工程を経て固体撮像装置が完成される。

【００１９】次に、同一基板上から複数個の固体撮像装置を製造する方法を説明する。ガラス基板上に複数の溝枠を形成する第１工程と、前記溝枠の周囲に電極端子群を形成する第２工程と、前記ガラス基板上の電極端子群と固体撮像素子の突起電極とを接合し、複数個の固体撮像素子をマトリクス状に実装する第３工程と、前記複数個の固体撮像素子を封止樹脂にて封止する第４工程と、前記複数個の固体撮像素子が実装されたガラス基板をダイシングにより切断し、個々の固体撮像装置に分離する第４工程とを有する。

【００２０】図７は本発明の多面取りしたガラス基板の斜視図で、ガラス基板上に複数の溝枠を形成する第１工程と、前記複数の溝枠の周囲それぞれに電極端子群を形成する第２工程を示す図である。１５はガラス基板で、複数の溝枠１５ａがマトリクス状に形成される。溝枠形成はエッチング法により複数の溝枠１５ａを同時に形成する。次に、溝枠１５ａの外側周辺にに電極端子群１６を蒸着法により銅等の金属層を蒸着して形成する。

【００２１】図８はガラス基板上に搭載した固体撮像素子の斜視図で、複数個の固体撮像素子をマトリクス状に実装する第３工程を示す図である。複数の溝枠１５ａと該溝枠１５ａの周囲に電極端子群１６を形成したガラス基板上に、突起電極が形成された固体撮像素子１７をフェースダウン実装する。

【００２２】第１から第３行程を経た後、第４行程では複数の固体撮像素子１７のそれぞれの外周部に封止樹脂を塗布し、加熱して硬化する。

【００２３】最後に、第５工程においてガラス基板上に搭載され、樹脂封止された複数の固体撮像素子を個々の固体撮像装置に切断分離する。切断にはダイシング装置を用い、ガラス基板をカットして個々の固体撮像装置が完成する。

【００２４】

【発明の効果】本発明によれば、ガラス基板に突起電極を形成した固体撮像素子を直接実装することでセラミックパッケージ等の部材が必要なくなり、小型、薄型化した固体撮像装置を提供できる。また、工数が削減できる。

【００２５】多面取りした基板上に複数個の固体撮像素子を実装し、樹脂封止後個々に分割する方法により、固体撮像装置の量産性が向上し、容易に製造でき、安価な装置を提供することができる。

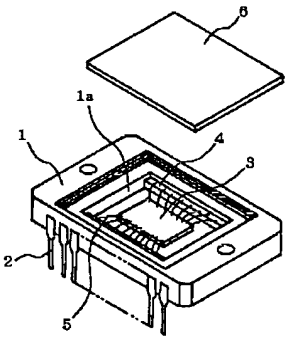
【図面の簡単な説明】

【図１】従来の固体撮像装置の斜視図
【図２】従来の固体撮像装置をレンズ体に組み込んだ状態を示す断面図
【図３】本発明の一実施形態で固体撮像装置の断面図
【図４】本発明の固体撮像装置の平面図
【図５】本発明の第３工程を示す図
【図６】本発明の固体撮像素子を封止樹脂した平面図
【図７】本発明の多面取りしたガラス基板の斜視図
【図８】本発明の基板上に搭載した固体撮像素子の斜視図

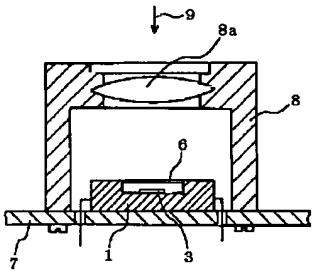
【符号の説明】

1	セラミックパッケージ
1ａ	凹部
2	電極端子群
3	固体撮像素子
4	電極
5	金属細線
6	ガラス
7	基板
8	レンズ体
8ａ	レンズ
9	入射光
１０	ガラス基板
１０ａ	溝枠
１１	電極端子群
１２	固体撮像素子
１３	突起電極
１４	封止樹脂
１５	ガラス基板
１５ａ	溝枠
１６	電極端子群
１７	固体撮像素子

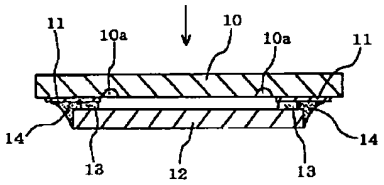
【図１】



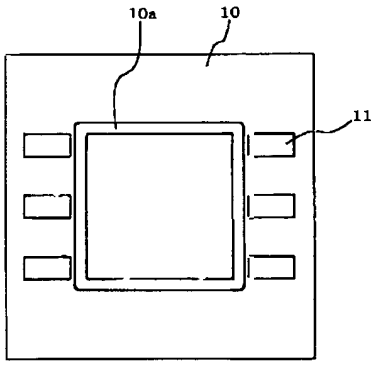
【図２】



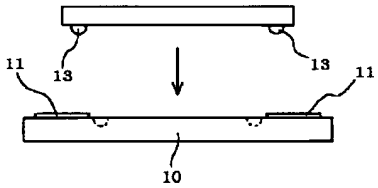
【図３】



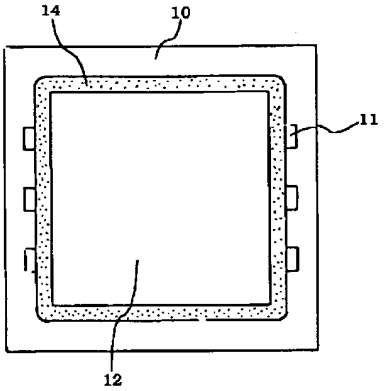
【図４】



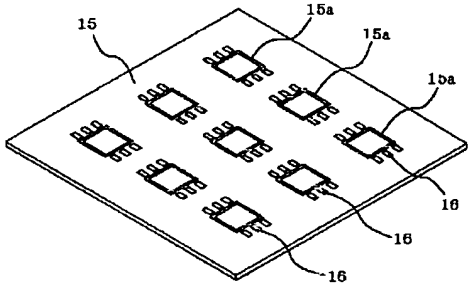
【図５】



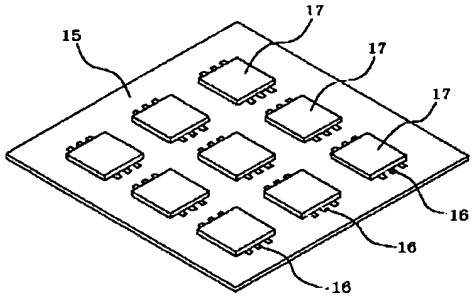
【図６】



【図7】



【図8】



DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The perspective view of the conventional solid state camera
[Drawing 2] The sectional view showing the condition of having built the conventional solid state camera into the lens object
[Drawing 3] It is 1 operation gestalt of this invention, and is the sectional view of a solid state camera.
[Drawing 4] The top view of the solid state camera of this invention
[Drawing 5] Drawing showing the 3rd process of this invention
[Drawing 6] The top view which carried out the closure resin of the solid state image sensor of this invention
[Drawing 7] The perspective view of the glass substrate which picked many sides of this invention
[Drawing 8] The perspective view of the solid state image sensor carried on the substrate of this invention
[Description of Notations]
1 Ceramic Package
1a Crevice
2 Electrode Terminal Block
3 Solid State Image Sensor
4 Electrode
5 Metal Thin Line
6 Glass
7 Substrate
8 Lens Object
8a Lens
9 Incident Light
10 Glass Substrate
10a ****
11 Electrode Terminal Block
12 Solid State Image Sensor
13 Projection Electrode
14 Closure Resin
15 Glass Substrate
15a ****
16 Electrode Terminal Block
17 Solid State Image Sensor

[Translation done.]

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MEANS

[Means for Solving the Problem]
[0009] It considers as the solid state camera constituted from a glass substrate which has **** around the electrode terminal block which outputs an electrical signal outside, and this electrode terminal block, a solid state image sensor joined to the field where the electrode terminal block on said glass substrate and said **** were formed, and closure resin for closing said solid state image sensor.
[0010] The manufacture approach of a solid state camera of having the process which joins the process which forms **** on a glass substrate, the process which forms an electrode terminal block in the perimeter of said ****, and the electrode terminal block on said glass substrate and the projection electrode of a solid state image sensor, and the process which closes said solid state image sensor by closure resin.
[0011] The process which forms two or more **** on the same glass substrate, and the process which forms an electrode terminal block in the perimeter of said ****, The process which joins the electrode terminal block and the projection electrode of a solid state image sensor which were formed on said glass substrate, and mounts two or more solid state image sensors in the shape of a matrix, The manufacture approach of a solid state camera of having the process which closes said two or more solid state image sensors by closure resin, and the process which cuts the glass substrate with which said two or more solid state image sensors were mounted by dicing, and is divided into each solid state camera.
[0012]
[Embodiment of the Invention] One operation gestalt of this invention is explained based on drawing below. Drawing 3 is the sectional view of a solid state camera with 1 operation gestalt of this invention. 10 is a glass substrate and **** 10a is formed on this glass substrate 10. 11 is the electrode terminal block which outputs an electrical signal to the exterior formed on the glass substrate 10, and is formed in the periphery of **** 10a. 12 is a solid state image sensor and the electrode terminal block 11 on a substrate 10 is connected with the projection electrode 13 prepared in the solid state image sensor 12 by electroconductive glue etc. (un-illustrating). 14 is closure resin and carries out the resin seal of the clearance between a solid state image sensor 12 and a glass substrate 10. In this case, closure resin 14 is applied along with the periphery of a solid state image sensor 12. Heat hardening of said closure resin 14 is carried out, and the solid state camera is constituted.
[0013] The arrow head of drawing 3 shows the direction of incidence of light, and the inside of **** 10a of a glass substrate 10 serves as light-receiving area. In case **** 10a carries out the resin seal of the solid state image sensor 12, it is prepared in order to prevent that closure resin 14 flows in in light-receiving area from the clearance between a solid state image sensor 12 and a glass substrate 10. Although closure resin 14 flows into a light-receiving area side in a resin seal, invasion in light-receiving area can be prevented by being absorbed by **** 10a.
[0014] Next, it explains, referring to a drawing about the manufacture approach of the solid state camera of this invention. Drawing 4 to drawing 6 is drawing showing each production process.
[0015] The manufacture approach of this invention has the 3rd process which joins the 1st process which forms **** on a glass substrate, the 2nd process which forms an electrode terminal block in the perimeter of said ****, and the electrode terminal block on said glass substrate and the projection electrode of a solid state image sensor, and the 4th process which closes said solid state image sensor by closure resin.
[0016] Drawing 4 is the top view of a glass substrate, and is drawing showing the 1st process which forms **** on a glass substrate, and the 2nd process which forms an electrode terminal block in the perimeter of said ****. First, **** 10a is formed in a glass substrate 10. Formation of **** 10a can be easily performed by using the etching method. After forming **** 10a, the electrode terminal block 11 is formed on the outskirts of an outside of **** 10a. The electrode terminal block 11 is easily made by forming metal layers, such as copper, chromium, and aluminum, in the front face of a glass substrate 10 with vacuum deposition.

[0017] Drawing 5 is drawing showing the 3rd process which joins the electrode terminal block on a glass substrate, and the projection electrode of a solid state image sensor. Au bump etc. be alike on the electrode formed in the periphery of a solid state image sensor 3 -- the Li projection electrode 13 is formed and the electrode terminal block 11 and said projection electrode 13 on a glass substrate 10 are joined using electroconductive glue (un-illustrating) etc. The forming face of the projection electrode 13 is in the same field as the light-receiving side of a solid state image sensor 12, and carries out face down mounting to the field in which **** 10a of a glass substrate 10 and the electrode terminal block 11 were formed. The junction to the electrode terminal block 11 of a glass substrate 10 and the projection electrode 13 of a solid state image sensor 12 can be joined with a sufficient precision with an automatic mounting machine.

[0018] Drawing 6 is the top view showing the 4th process which closes the solid state image sensor of this invention by closure resin. In the 3rd process, after joining a solid state image sensor 12 to a glass substrate 10, closure resin 14 is applied, heated and hardened on the periphery of a solid state image sensor 12. Although the resin of an epoxy system is used for closure resin, even if closure resin invades into a light-receiving area side somewhat from the slit of a solid state image sensor 12 and a glass substrate 10, it does not invade up to the inside of light-receiving area by flowing into **** 10a. A solid state camera is completed through the above-mentioned process.

[0019] Next, how to manufacture two or more solid state cameras from the same substrate is explained. The 1st process which forms two or more **** on a glass substrate, and the 2nd process which forms an electrode terminal block in the perimeter of said ****, The 3rd process which joins the electrode terminal block on said glass substrate, and the projection electrode of a solid state image sensor, and mounts two or more solid state image sensors in the shape of a matrix, It has the 4th process which closes said two or more solid state image sensors by closure resin, and the 4th process which cuts the glass substrate with which said two or more solid state image sensors were mounted by dicing, and is divided into each solid state camera.

[0020] Drawing 7 is the perspective view of the glass substrate which picked many sides of this invention, and is drawing showing the 1st process which forms two or more **** on a glass substrate, and the 2nd process which forms an electrode terminal block in each perimeter of two or more of said ****. 15 is a glass substrate and two or more **** 15a is formed in the shape of a matrix. **** formation forms two or more **** 15a in coincidence by the etching method. next, it is alike on the outskirts of an outside of **** 15a, and metal layers, such as copper, are vapor-deposited with vacuum deposition, and the electrode terminal block 16 is formed.

[0021] Drawing 8 is the perspective view of the solid state image sensor carried on the glass substrate, and is drawing showing the 3rd process which mounts two or more solid state image sensors in the shape of a matrix. Face down mounting of the solid state image sensor 17 with which the projection electrode was formed on the glass substrate in which the electrode terminal block 16 was formed to the perimeter of two or more **** 15a and this **** 15a is carried out.

[0022] After passing about through the 1st to 3rd line, closure resin is applied, heated and hardened about by the 4th line in the periphery section of each of two or more solid state image sensors 17.

[0023] Finally, in the 5th process, it is carried on a glass substrate, and cutting separation of two or more solid state image sensors by which the resin seal was carried out is carried out at each solid state camera. A glass substrate is cut into cutting using dicing equipment, and each solid state camera is completed.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] As an electric connection method of a solid state image sensor, although the electrode of a ceramic package and the electrode of a solid state image sensor are connected by wire bonding, the field which forms the electrode for wiring a metal thin line is required for the periphery of a solid state image sensor, and it is necessary to also secure a tooth space required for loop-formation formation of a metal thin line between a solid state image sensor and the glass for the closures with the configuration of the above conventional solid state cameras. For this reason, the solid state camera became large and small and thin-shape-izing were difficult.

[0007] Moreover, a man day will start also in a production process, the time amount with which a solid state image sensor is polluted by atmospheric air by performing wire bonding will become long, and it will have a bad influence on a solid state image sensor. Furthermore, since the ceramic package was used, member cost became high and the solid state camera became expensive.

[0008] This invention is cheap and tends to offer small, a thin solid state camera, and its manufacture approach.

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EFFECT OF THE INVENTION

[Effect of the Invention] According to this invention, members, such as a ceramic package, become unnecessary by mounting directly the solid state image sensor in which the projection electrode was formed in a glass substrate, and small and the thin-shape-ized solid state camera can be offered. Moreover, a man day is reducible.
[0025] Two or more solid state image sensors are mounted on the substrate which picked many sides, by the approach of dividing into after [a resin seal] each, the mass-production nature of a solid state camera can improve, it can manufacture easily, and cheap equipment can be offered.

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PRIOR ART

[Description of the Prior Art] The conventional solid state camera has the common structure which carried the solid state image sensor which makes CCD representation in the ceramic package, and was closed with glass. Hereafter, it explains, referring to a drawing about the conventional solid state camera.
[0003] Drawing 1 is the perspective view of the conventional solid state camera. 1 is a ceramic package and has the terminal block 2 which outputs an electrical signal outside. It is carried in crevice 1a of the top face of a ceramic package 1 in the condition that the solid state image sensor 3 turned the light sensing portion up, and the electrode 4 in crevice 1a of the top face of a ceramic package 1 and the electrode (un-illustrating) formed around solid state image sensor 3 front face are electrically connected by the metal thin line 5 by the wire-bonding method. 6 is glass, closes the up opening part of a ceramic package 1 in the shape of a lid for the purpose of protection of a solid state image sensor 3, and constitutes the solid state camera.
[0004] Drawing 2 is the sectional view showing the condition of having built the conventional solid state camera into the lens object. A ceramic package 1 is connected to a substrate 7 through the electrode terminal block 2, and the tubed lens object 8 equipped with lens 8a is carried in the top face of a ceramic package 1. The solid state camera built into the lens object is used as the image pick-up sections, such as a video camera.
[0005] The incident light 9 at the time of photoing a photographic subject etc. passes along lens 8a, passes the glass 6 formed in the top face of a ceramic package 1, and it carries out incidence to a solid state image sensor 3. By the light sensing portion of a solid state image sensor 3, the light which carried out incidence is changed into an electrical signal, and is processed as image data.

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TECHNICAL FIELD

[Field of the Invention] This invention is cheap and relates to small, a thin solid state camera, and its manufacture approach.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention is cheap and relates to small, a thin solid state camera, and its manufacture approach.
[0002]
[Description of the Prior Art] The conventional solid state camera has the common structure which carried the solid state image sensor which makes CCD representation in the ceramic package, and was closed with glass. Hereafter, it explains, referring to a drawing about the conventional solid state camera.
[0003] Drawing 1 is the perspective view of the conventional solid state camera. 1 is a ceramic package and has the terminal block 2 which outputs an electrical signal outside. It is carried in crevice 1a of the top face of a ceramic package 1 in the condition that the solid state image sensor 3 turned the light sensing portion up, and the electrode 4 in crevice 1a of the top face of a ceramic package 1 and the electrode (un-illustrating) formed around solid state image sensor 3 front face are electrically connected by the metal thin line 5 by the wire-bonding method. 6 is glass, closes the up opening part of a ceramic package 1 in the shape of a lid for the purpose of protection of a solid state image sensor 3, and constitutes the solid state camera.
[0004] Drawing 2 is the sectional view showing the condition of having built the conventional solid state camera into the lens object. A ceramic package 1 is connected to a substrate 7 through the electrode terminal block 2, and the tubed lens object 8 equipped with lens 8a is carried in the top face of a ceramic package 1. The solid state camera built into the lens object is used as the image pick-up sections, such as a video camera.
[0005] The incident light 9 at the time of photoing a photographic subject etc. passes along lens 8a, passes the glass 6 formed in the top face of a ceramic package 1, and it carries out incidence to a solid state image sensor 3. By the light sensing portion of a solid state image sensor 3, the light which carried out incidence is changed into an electrical signal, and is processed as image data.
[0006]
[Problem(s) to be Solved by the Invention] As an electric connection method of a solid state image sensor, although the electrode of a ceramic package and the electrode of a solid state image sensor are connected by wire bonding, the field which forms the electrode for wiring a metal thin line is required for the periphery of a solid state image sensor, and it is necessary to also secure a tooth space required for loop-formation formation of a metal thin line between a solid state image sensor and the glass for the closures with the configuration of the above conventional solid state cameras. For this reason, the solid state camera became large and small and thin-shape-izing were difficult.
[0007] Moreover, a man day will start also in a production process, the time amount with which a solid state image sensor is polluted by atmospheric air by performing wire bonding will become long, and it will have a bad influence on a solid state image sensor. Furthermore, since the ceramic package was used, member cost became high and the solid state camera became expensive.
[0008] This invention is cheap and tends to offer small, a thin solid state camera, and its manufacture approach.
[Means for Solving the Problem]
[0009] It considers as the solid state camera constituted from a glass substrate which has **** around the electrode terminal block which outputs an electrical signal outside, and this electrode terminal block, a solid state image sensor joined to the field where the electrode terminal block on said glass substrate and said **** were formed, and closure resin for closing said solid state image sensor.
[0010] The manufacture approach of a solid state camera of having the process which joins the process which forms **** on a glass substrate, the process which forms an electrode terminal block in the perimeter of said ****, and the electrode

terminal block on said glass substrate and the projection electrode of a solid state image sensor, and the process which closes said solid state image sensor by closure resin.

[0011] The process which forms two or more **** on the same glass substrate, and the process which forms an electrode terminal block in the perimeter of said ****, The process which joins the electrode terminal block and the projection electrode of a solid state image sensor which were formed on said glass substrate, and mounts two or more solid state image sensors in the shape of a matrix, The manufacture approach of a solid state camera of having the process which closes said two or more solid state image sensors by closure resin, and the process which cuts the glass substrate with which said two or more solid state image sensors were mounted by dicing, and is divided into each solid state camera.

[0012]

[Embodiment of the Invention] One operation gestalt of this invention is explained based on drawing below. Drawing 3 is the sectional view of a solid state camera with 1 operation gestalt of this invention. 10 is a glass substrate and **** 10a is formed on this glass substrate 10. 11 is the electrode terminal block which outputs an electrical signal to the exterior formed on the glass substrate 10, and is formed in the periphery of **** 10a. 12 is a solid state image sensor and the electrode terminal block 11 on a substrate 10 is connected with the projection electrode 13 prepared in the solid state image sensor 12 by electroconductive glue etc. (un-illustrating). 14 is closure resin and carries out the resin seal of the clearance between a solid state image sensor 12 and a glass substrate 10. In this case, closure resin 14 is applied along with the periphery of a solid state image sensor 12. Heat hardening of said closure resin 14 is carried out, and the solid state camera is constituted.

[0013] The arrow head of drawing 3 shows the direction of incidence of light, and the inside of **** 10a of a glass substrate 10 serves as light-receiving area. In case **** 10a carries out the resin seal of the solid state image sensor 12, it is prepared in order to prevent that closure resin 14 flows in in light-receiving area from the clearance between a solid state image sensor 12 and a glass substrate 10. Although closure resin 14 flows into a light-receiving area side in a resin seal, invasion in light-receiving area can be prevented by being absorbed by **** 10a.

[0014] Next, it explains, referring to a drawing about the manufacture approach of the solid state camera of this invention. Drawing 4 to drawing 6 is drawing showing each production process.

[0015] The manufacture approach of this invention has the 3rd process which joins the 1st process which forms **** on a glass substrate, the 2nd process which forms an electrode terminal block in the perimeter of said ****, and the electrode terminal block on said glass substrate and the projection electrode of a solid state image sensor, and the 4th process which closes said solid state image sensor by closure resin.

[0016] Drawing 4 is the top view of a glass substrate, and is drawing showing the 1st process which forms **** on a glass substrate, and the 2nd process which forms an electrode terminal block in the perimeter of said ****. First, **** 10a is formed in a glass substrate 10. Formation of **** 10a can be easily performed by using the etching method. After forming **** 10a, the electrode terminal block 11 is formed on the outskirts of an outside of **** 10a. The electrode terminal block 11 is easily made by forming metal layers, such as copper, chromium, and aluminum, in the front face of a glass substrate 10 with vacuum deposition.

[0017] Drawing 5 is drawing showing the 3rd process which joins the electrode terminal block on a glass substrate, and the projection electrode of a solid state image sensor. Au bump etc. be alike on the electrode formed in the periphery of a solid state image sensor 3 -- the Li projection electrode 13 is formed and the electrode terminal block 11 and said projection electrode 13 on a glass substrate 10 are joined using electroconductive glue (un-illustrating) etc. The forming face of the projection electrode 13 is in the same field as the light-receiving side of a solid state image sensor 12, and carries out face down mounting to the field in which **** 10a of a glass substrate 10 and the electrode terminal block 11 were formed. The junction to the electrode terminal block 11 of a glass substrate 10 and the projection electrode 13 of a solid state image sensor 12 can be joined with a sufficient precision with an automatic mounting machine.

[0018] Drawing 6 is the top view showing the 4th process which closes the solid state image sensor of this invention by closure resin. In the 3rd process, after joining a solid state image sensor 12 to a glass substrate 10, closure resin 14 is applied, heated and hardened on the periphery of a solid state image sensor 12. Although the resin of an epoxy system is used for closure resin, even if closure resin invades into a light-receiving area side somewhat from the slit of a solid state image sensor 12 and a glass substrate 10, it does not invade up to the inside of light-receiving area by flowing into **** 10a. A solid state camera is completed through the above-mentioned process.

[0019] Next, how to manufacture two or more solid state cameras from the same substrate is explained. The 1st process which forms two or more **** on a glass substrate, and the 2nd process which forms an electrode terminal block in the perimeter of said ****, The 3rd process which joins the electrode terminal block on said glass substrate, and the projection electrode of a solid state image sensor, and mounts two or more solid state image sensors in the shape of a matrix, It has the 4th process which closes said two or more solid state image sensors by closure resin, and the 4th process

which cuts the glass substrate with which said two or more solid state image sensors were mounted by dicing, and is divided into each solid state camera.

[0020] Drawing 7 is the perspective view of the glass substrate which picked many sides of this invention, and is drawing showing the 1st process which forms two or more **** on a glass substrate, and the 2nd process which forms an electrode terminal block in each perimeter of two or more of said ****. 15 is a glass substrate and two or more **** 15a is formed in the shape of a matrix. **** formation forms two or more **** 15a in coincidence by the etching method. next, it is alike on the outskirts of an outside of **** 15a, and metal layers, such as copper, are vapor-deposited with vacuum deposition, and the electrode terminal block 16 is formed.

[0021] Drawing 8 is the perspective view of the solid state image sensor carried on the glass substrate, and is drawing showing the 3rd process which mounts two or more solid state image sensors in the shape of a matrix. Face down mounting of the solid state image sensor 17 with which the projection electrode was formed on the glass substrate in which the electrode terminal block 16 was formed to the perimeter of two or more **** 15a and this **** 15a is carried out.

[0022] After passing about through the 1st to 3rd line, closure resin is applied, heated and hardened about by the 4th line in the periphery section of each of two or more solid state image sensors 17.

[0023] Finally, in the 5th process, it is carried on a glass substrate, and cutting separation of two or more solid state image sensors by which the resin seal was carried out is carried out at each solid state camera. A glass substrate is cut into cutting using dicing equipment, and each solid state camera is completed.

[0024]

[Effect of the Invention] According to this invention, members, such as a ceramic package, become unnecessary by mounting directly the solid state image sensor in which the projection electrode was formed in a glass substrate, and small and the thin-shape-ized solid state camera can be offered. Moreover, a man day is reducible.

[0025] Two or more solid state image sensors are mounted on the substrate which picked many sides, by the approach of dividing into after [a resin seal] each, the mass-production nature of a solid state camera can improve, it can manufacture easily, and cheap equipment can be offered.

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CLAIMS

[Claim(s)]
[Claim 1] The solid state camera characterized by constituting from a glass substrate which has **** around the electrode terminal block which outputs an electrical signal outside, and this electrode terminal block, a solid state image sensor joined to the field where the electrode terminal block on said glass substrate and said **** were formed, and closure resin for closing said solid state image sensor.
[Claim 2] The manufacture approach of the solid state camera characterized by having the process which joins the process which forms **** on a glass substrate, the process which forms an electrode terminal block in the perimeter of said ****, and the electrode terminal block on said glass substrate and the projection electrode of a solid state image sensor, and the process which closes said solid state image sensor by closure resin.
[Claim 3] The process which forms two or more **** on the same glass substrate, and the process which forms an electrode terminal block in the perimeter of said ****, The process which joins the electrode terminal block and the projection electrode of a solid state image sensor which were formed on said glass substrate, and mounts two or more solid state image sensors in the shape of a matrix, The manufacture approach of the solid state camera characterized by having the process which closes said two or more solid state image sensors by closure resin, and the process which cuts the glass substrate with which said two or more solid state image sensors were mounted by dicing, and is divided into each solid state camera.

[Translation done.]